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Nuclear developments, great! But what about the waste?

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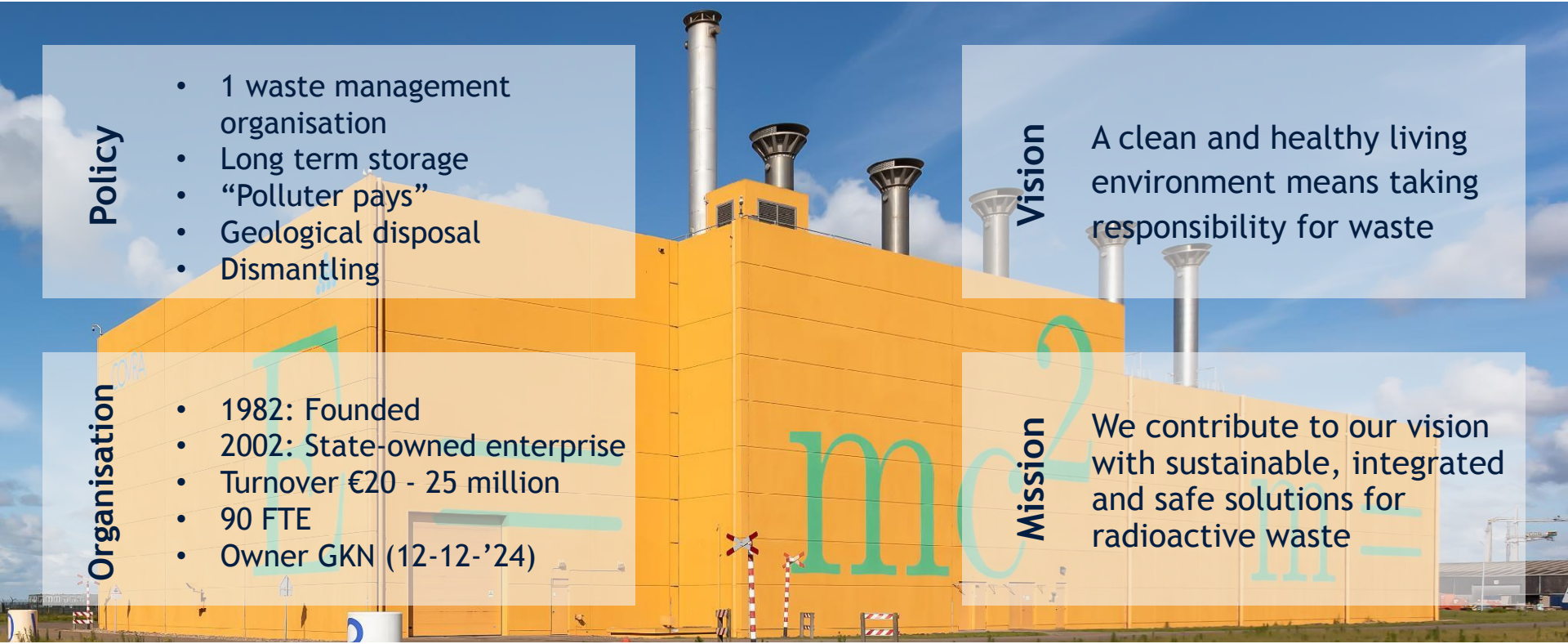

Policy

- 1 waste management organisation
- Long term storage
- “Polluter pays”
- Geological disposal
- Dismantling

Vision

A clean and healthy living environment means taking responsibility for waste

Organisation

- 1982: Founded
- 2002: State-owned enterprise
- Turnover €20 - 25 million
- 90 FTE
- Owner GKN (12-12-’24)

Mission

We contribute to our vision with sustainable, integrated and safe solutions for radioactive waste

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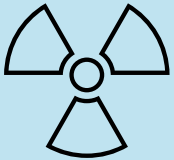


Integral waste chain

Manage and implement infrastructure for all waste producers and all wastes throughout the chain

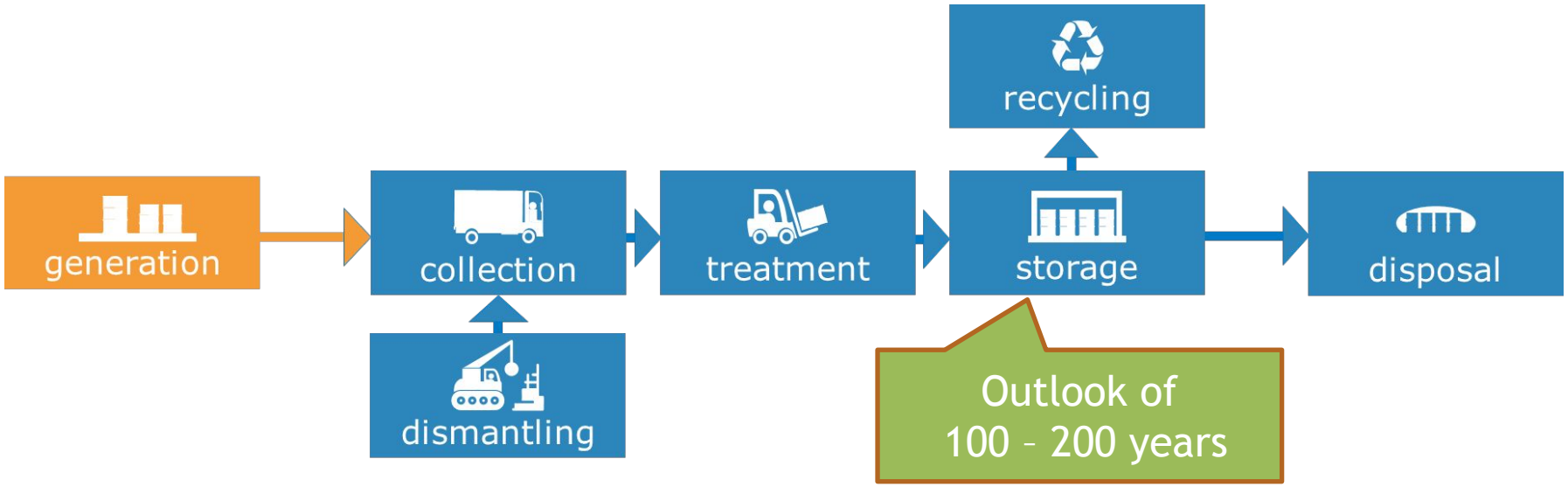
Knowledge, innovation & research

Knowledge partner for the government and society to support national waste policy and management

Advice & services

Advisor and service provider to parties in the nuclear sector

INTEGRATED WASTE MANAGEMENT CHAIN



NUCLEAR LANDSCAPE

New NPPs

+

New SMRs

PALLAS 2030
Research Reactor
under development

NRG 1961
Research Reactor
45 MW_{th}

URENCO 1973
Uranium enrichment plant
5,400 tSW/year

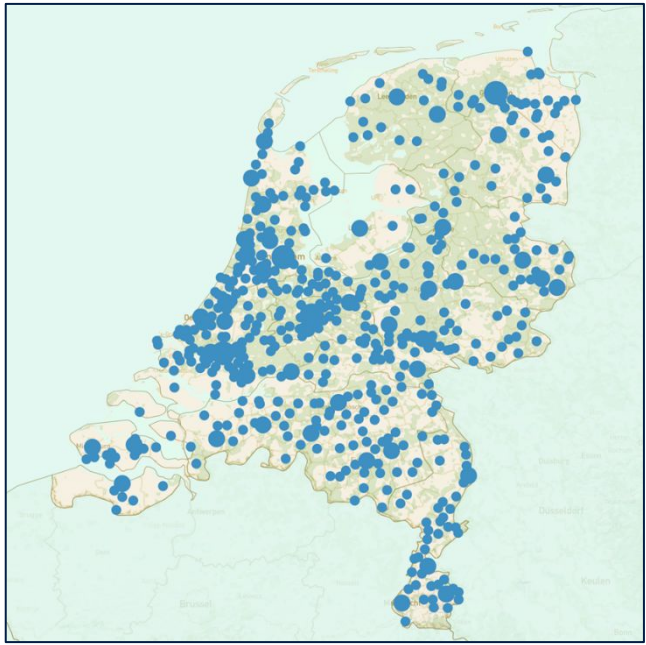
TU Delft 1964
Research Reactor
2 MW_{th}

GKN 1969 -1997
BWR, safe enclosure
58 MW_e

COVRA 1982
Radioactive waste
management organisation

EPZ 1973-2034
Operating PWR
500 MW_e

Research
Medical
Industry



PREPARE FOR NEW NUCLEAR

Without a solution for radioactive waste, new nuclear is technically not feasible and publicly not acceptable

NUCLEAR DEVELOPMENTS - NETHERLANDS

- Lifetime extension nuclear power plant Borssele (EPZ) (20 years)
- Two, maybe four new large nuclear power plants: NEO-NL. Aspiration: 7 gigawatt
- Developing Small Modular Reactors (SMRs)
- Uranium enrichment company Urenco (Almelo) is expanding capacity
- PALLAS-reactor (production medical isotopes, Petten) in operation around 2030
- Decommissioning of old nuclear power plants and nuclear facilities
- Expansion of nuclear knowledge ecosystem:
    - Research and all levels of education
    - Reinforcement of governance and policy
    - International collaborations

NEW NUCLEAR

Discussion shifted from: WHY?

Chances:

- CO2-neutral energy production
- Less space required
- High availability

Risks:

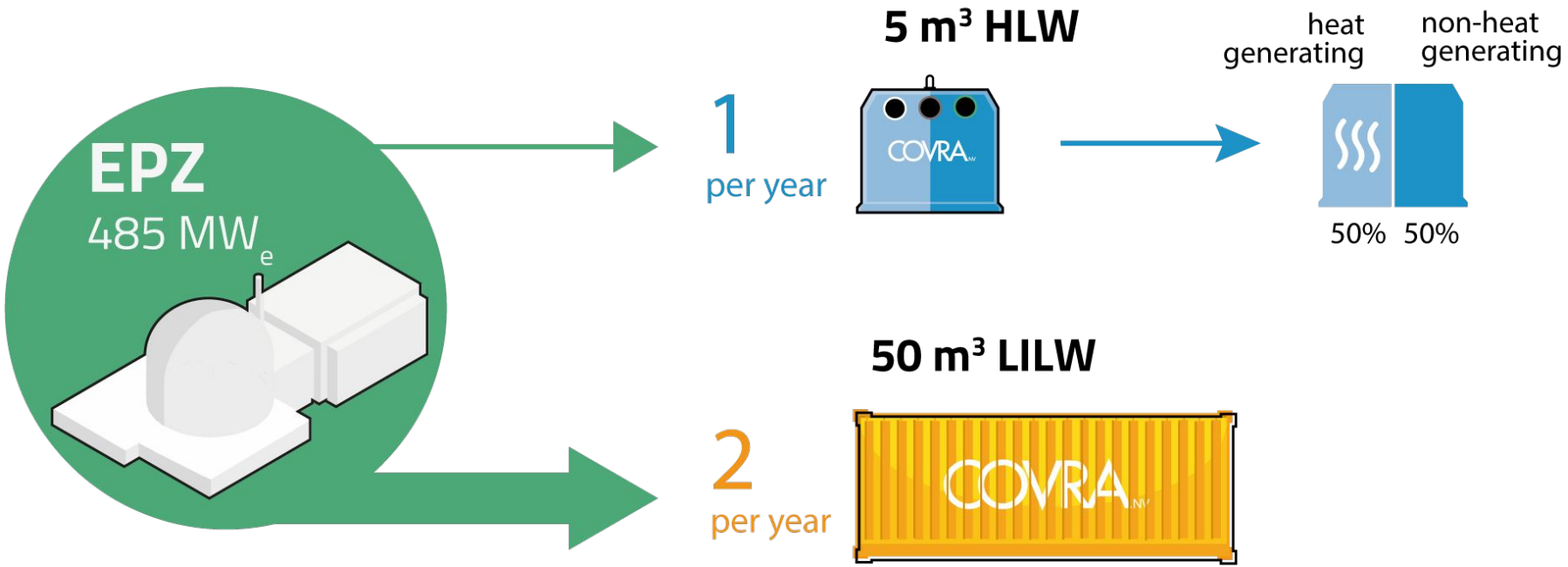
- Perception of safety
- Costs
- Radioactive waste management

To: HOW?

- Concepts for financing
- Duration of the project (timing)
- Local integration during building phase
- Connection to (high-voltage) grid
- Permits
- Public acceptance

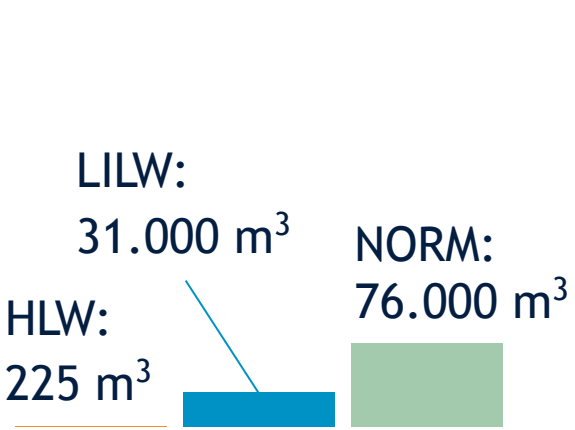
Radioactive waste management: volume and quality

WASTE PRODUCTION OF NPP



Waste production proportional with power output (MW)

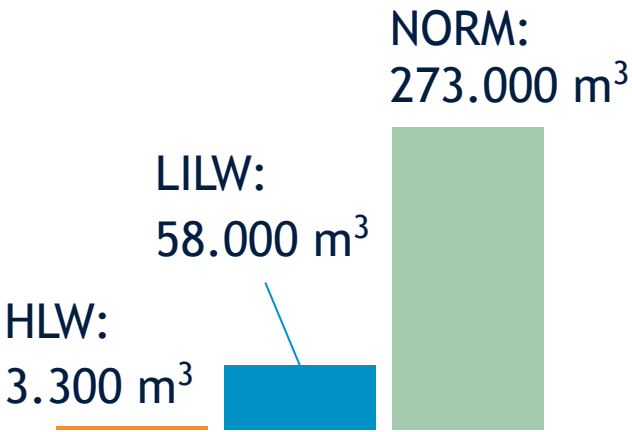
NEW NUCLEAR, NEW WASTE



1

- Existing installations
- PALLAS

TOTAL
1982-2130



2

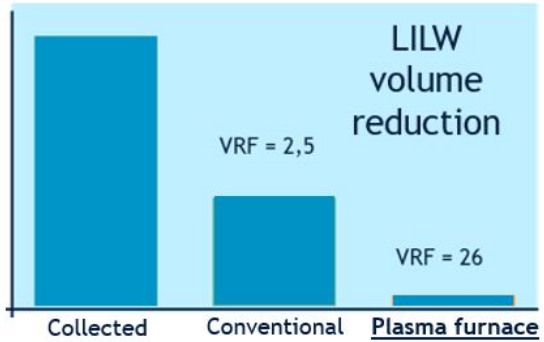
- Existing installations
- PALLAS
- Capacity & lifetime extension Urenco
- 2 new NPPs & EPZ+10

Plasma furnace

MITIGATION

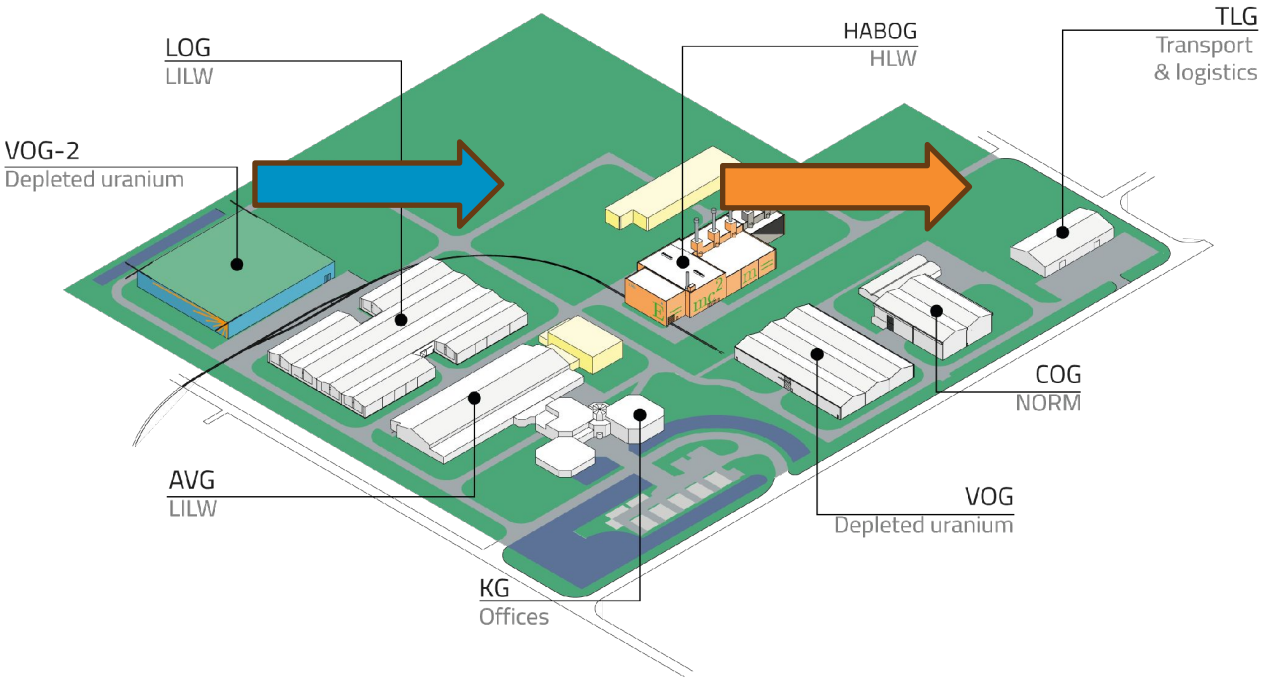
Main solution: Plasma furnace

- Unique concept: only two plasma furnaces in Europe
- Significant volume reduction factor
- Less space required: space on site until far beyond 2100
- Mainly reduces LILW (storage of HLW not an issue)



MASTERPLAN 2050

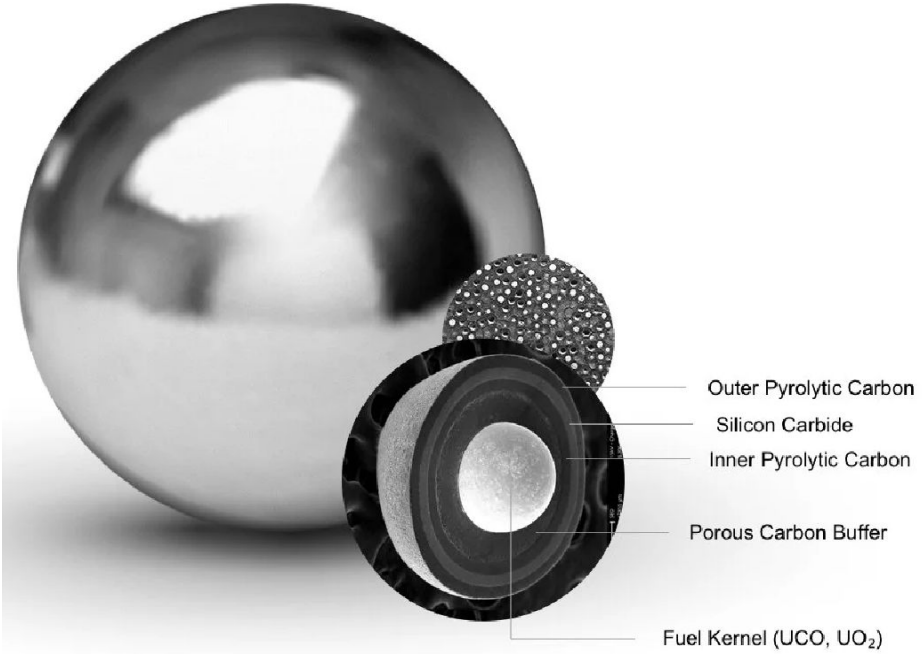
- Space for all radioactive waste up to 2050-2100
- Plasma furnace is critical to minimize the volume of LILW
- Reprocessing of spent fuel yes/no: limited impact on site



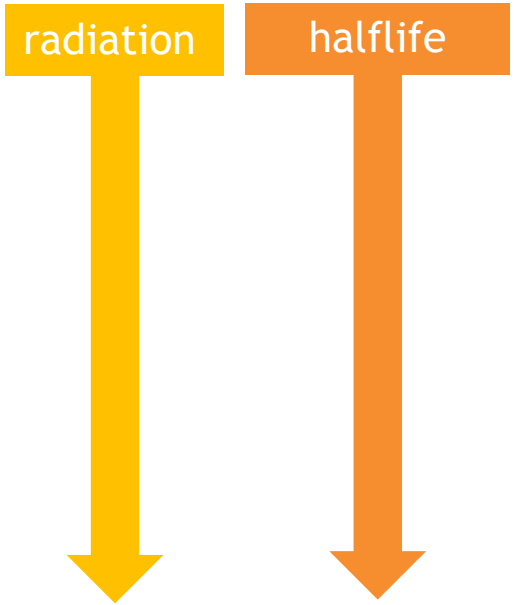
Conclusion of Masterplan 2050: site dynamics governed by depleted uranium

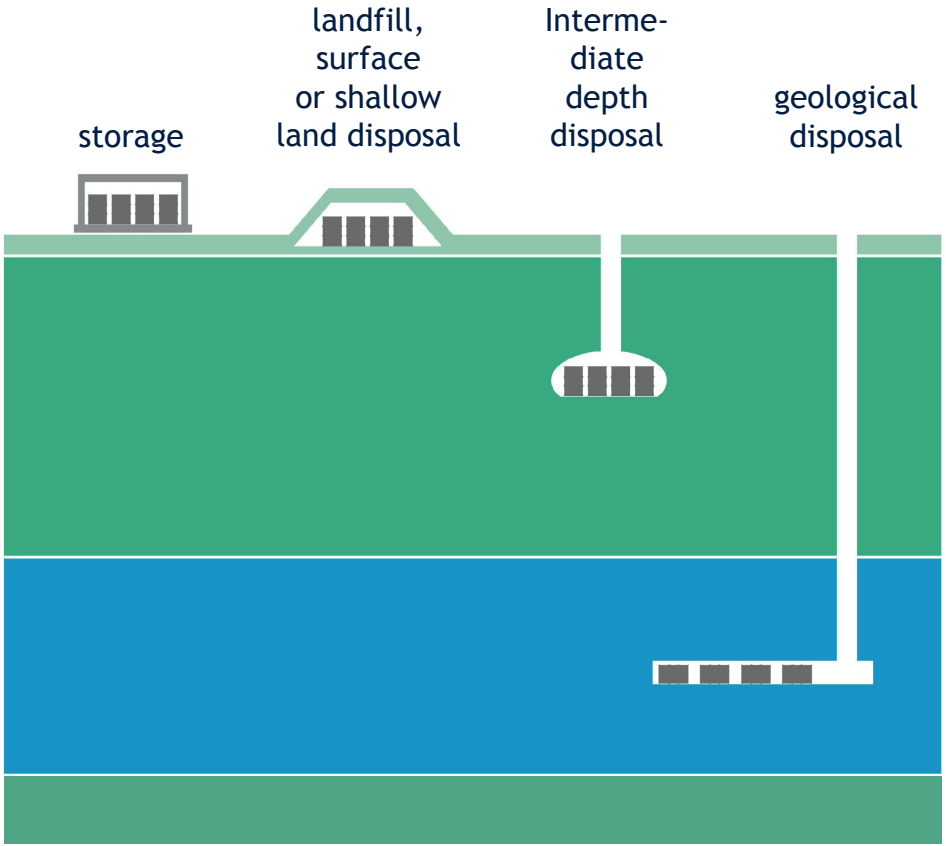
QUALITY CHALLENGES

- Increase of volume radioactive waste
- More complex waste
- New solutions to be developed (pre-disposal, disposal)

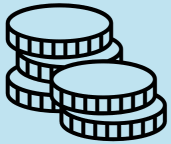


DISPOSAL


radiation
halflife

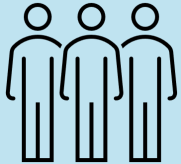

storage
landfill, surface or shallow land disposal
Interme-diate depth disposal
geological disposal

ENABLERS



Solid financing

Have sufficient (access to) financial resources to ensure independence and continuity



Future-proof organisation

An increasingly complex and rapidly changing context demands a proactive approach and a steady development of the organization

Responsible business conduct

Contribute to the sustainability of the sector and the environment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NV